We claim:

1. A microsystem platform for separating an analyte from a fluid sample, comprising

a) a rotatable platform, comprising a substrate having a first flat, planar surface and a second flat, planar surface opposite thereto, each surface comprising a center about which the platform is rotated, wherein the first surface comprises in combination

b) an entry port comprising a depression in the first surface having a volumetric capacity of about 1 to about 150μL, that is fluidly connected by a first microchannel with

c) a mixing chamber positioned on the platform farther from the center of rotation than the entry port; the platform further comprising

i) a reagent reservoir comprising liquid reagents for preparing the fluid sample for the analyte separation assay, wherein the reagent reservoir if fluidly connected to the mixing chamber by a second microchannel, the platform further comprising

d) a secondary metering chamber comprising a first metering portion and a second metering portion each defining a volume of the fluid and separated by a septum that extends from a position in the chamber farthest from the center of rotation to a position just short of a chamber wall closest to the center of rotation, wherein the end of the septum and the chamber wall define a fluid connection between the first and second metering portions, the metering chamber further comprising an overflow portion that is separated from the second metering portion by a septum that extends from a position in the chamber farthest from the center of rotation to a position just short of a chamber wall closest to the center of rotation, and wherein the first portion of the metering chamber is fluidly connected by a third microchannel to

e) an analyte separation assay chamber further comprising

i) an analyte binding matrix, wherein the analyte specifically binds to the matrix and is retained in the separation chamber thereby, wherein the

analyte separation assay chamber is further fluidly connected by a fourth microchannel with a separation matrix preparation buffer reservoir containing a preparation buffer and the analyte separation assay chamber is further fluidly connected by a fifth microchannel with a separation matrix wash buffer reservoir containing a separation matrix wash buffer, wherein each of the preparation buffer and wash buffer reservoirs are positioned closer to the center of rotation than the analyte separation assay chamber;

and wherein the second metering portion of the secondary metering chamber is fluidly connected by a sixth microchannel with

f) a read window that is further fluidly connected to the analyte separation assay chamber by a seventh microchannel and is further fluidly connected by a eighth microchannel to

g) a waste reservoir

wherein rotation of the platform motivates the fluid sample from the entry port into the mixing chamber and the reagents from the reagent reservoir into the mixing chamber to provide a sample reagent mixture, and wherein rotation of the platform motivates the sample reagent mixture from the mixing chamber into the secondary metering chamber, wherein the first metering portion is filled before the second metering portion and the second metering portion is filled before the overflow portion;

and wherein rotation of the platform motivates separation matrix preparation buffer through the analyte separation assay chamber, through the read chamber and into the waste reservoir,

and wherein rotation of the platform motivates the volume of the sample reagent mixture from the first metering portion of the secondary metering chamber through the analyte separation assay chamber whereby analyte in the sample reagent mixture binds to the analyte binding matrix;

and wherein rotation of the platform motivates analyte separation matrix wash buffer through the analyte separation assay chamber, thereby displacing the sample reagent mixture through the read window and into the waste reservoir;

and wherein rotation of the platform motivates the volume of the sample reagent mixture in the second metering portion of the secondary metering chamber into the read window and displaces the eluate from the analyte separation assay chamber from the read window.

2. The microsystem platform of Claim 1 wherein the analyte binding matrix is an inositol phosphate-derived membrane.

3. The microsystem platform of Claim 1 further comprising

e) a metering capillary and an overflow capillary, each being fluidly connected with the entry port, wherein each capillary defines a cross-sectional area of about 0.02mm to about 1mm in diameter, and wherein each capillary extends radially from the center of the platform and defines a first end proximally arrayed towards the center of the platform and a second end distally arrayed from the center of the platform, wherein the proximal end of each capillary defines a curved opening; wherein the metering capillary defines a volume of the fluid and wherein the metering capillary is fluidly connected with the mixing chamber and wherein the overflow capillary is fluidly connected with

f) an overflow chamber having a depth equal to or greater than the overflow capillary and positioned radially more distant from the center of the platform than the mixing chamber and the entry port,

wherein a capillary junction is formed at the junction of the metering capillary and the mixing chamber and at the junction of the overflow capillary and the overflow chamber, whereby fluid placed in the entry port flows by capillary action to the junction of the metering capillary and the mixing chamber, and excess fluid flows by capillary action to the junction of the overflow capillary and the overflow chamber; and wherein rotation of the platform at a first rotation speed motivates fluid displacement in the overflow capillary into the overflow chamber but not fluid displacement in the metering capillary, whereby rotation of the platform at the first rotational speed drains the fluid from the entry port into the overflow chamber; and

wherein rotation of the platform at a second rotation speed that is greater than the first rotational speed motivates fluid displacement of the volume of the fluid in the metering capillary into the mixing chamber; and wherein each of the assay chamber and overflow chamber also comprise air displacement channels whereby air displaced by fluid movement is vented to the surface of the platform.

4. The microsystem platform of Claim 1, further comprising

j) a sacrificial valve in the fourth, fifth, sixth, or seventh microchannels, wherein release of the sacrificial valve permits fluid flow through the microchannel when the platform is rotated at a non-zero rotational speed.

5. The microsystem platform of Claim 4 wherein the sacrificial valve is a solid, semi-solid or viscous liquid hydrocarbon, or a plastic.

6. The microsystem platform of Claim 5 further comprising a heating element in the platform in thermal contact with the sacrificial valve, wherein heating the heating element releases the sacrificial valve.

7. The microsystem platform of Claim 1, wherein the read chamber comprises a top surface that is translucent.

8. The microsystem platform of Claim 1 wherein the fluid sample is blood.

9. A microsystem platform for separating an analyte from a fluid sample, comprising

a) a rotatable platform, comprising a substrate having a first flat, planar surface and a second flat, planar surface opposite thereto, each surface comprising a center about which the platform is rotated, wherein the first surface comprises in combination

b) an entry port comprising a depression in the first surface having a volumetric capacity of about 1 to about 150μL, that is fluidly connected by a first microchannel with

c) a mixing chamber positioned on the platform farther from the center of rotation than the entry port and comprising liquid reagents for preparing the fluid sample for the analyte separation assay, wherein the mixing chamber is fluidly connected by a second microchannel with

d) a secondary metering chamber comprising a first metering portion and a second overflow portion wherein the first metering portion defines a volume of the sample reagent mixture, wherein the first metering portion and the second overflow portion are separated by a septum that extends from a position in the chamber farthest from the center of rotation to a position just short of a chamber wall closest to the center of rotation, wherein the end of the septum and the chamber wall define a fluid connection between the first metering portion and the overflow portion, and wherein the fluid connection between the first metering portion and the overflow portion is fluidly connected by a third microchannel to a read chamber positioned radially more distant from the center of rotation than the secondary metering chamber, and wherein the first metering portion of the secondary metering chamber is fluidly connected by a fourth microchannel to

e) an analyte separation assay chamber further comprising

i) an analyte binding matrix, wherein the analyte specifically binds to the matrix and is retained in the separation chamber thereby, wherein the analyte separation assay chamber is further fluidly connected by a fifth microchannel with a separation matrix buffer reservoir containing a buffer, wherein the matrix buffer reservoir is positioned closer to the center of rotation than the analyte separation assay chamber;

and wherein the analyte separation assay chamber is further fluidly connected by a sixth microchannel with

f) a read window manifold comprising a series of chambers separated by septa and arranged linearly and adjacently on the surface of the platform away from the position of the fluid connection of the manifold with the fifth microchannel;

wherein rotation of the platform motivates the fluid sample from the entry port into the mixing chamber to a sample reagent mixture, and wherein rotation of the platform motivates the sample reagent mixture from the mixing chamber into the secondary metering chamber, wherein the first metering portion is filled before the overflow portion and the read chamber is filled by fluid flow through the second microchannel before the overflow portion is filled;

and wherein rotation of the platform motivates separation matrix preparation buffer through the analyte separation assay chamber and into the read chamber manifold,

and wherein rotation of the platform motivates the volume of the sample reagent mixture from the first metering portion of the secondary metering chamber through the analyte separation assay chamber whereby analyte in the sample reagent mixture binds to the analyte binding matrix;

and wherein rotation of the platform motivates analyte separation matrix wash buffer through the analyte separation assay chamber, thereby displacing the sample reagent mixture into the read manifold.

10. The microsystem platform of Claim 9 further comprising

g) metering capillary and an overflow capillary, each being fluidly connected with the entry port, wherein each capillary defines a cross-sectional area of about 0.02mm to about 1mm in diameter, and wherein each capillary extends radially from the center of the platform and defines a first end proximally arrayed towards the center of the platform and a second end distally arrayed from the center of the platform, wherein the proximal end of each capillary defines a curved opening; wherein the metering capillary defines a volume of the fluid and wherein the metering capillary is fluidly connected with the mixing chamber and wherein the overflow capillary is fluidly connected with

h) overflow chamber having a depth in the platform equal to or greater than the overflow capillary and positioned radially more distant from the center of the platform than the mixing chamber and the entry port,

wherein a capillary junction is formed at the junction of the metering capillary and the mixing chamber and at the junction of the overflow capillary and the overflow chamber, whereby fluid placed in the entry port flows by capillary action to the junction of the metering capillary and the mixing chamber, and excess fluid flows by capillary action to the junction of the overflow capillary and the overflow chamber; and wherein rotation of the platform at a first rotation speed motivates fluid displacement in the overflow capillary into the overflow chamber but not fluid displacement in the metering capillary, whereby rotation of the platform at the first rotational speed drains the fluid from the entry port into the overflow chamber; and

wherein rotation of the platform at a second rotation speed that is greater than the first rotational speed motivates fluid displacement of the volume of the fluid in the metering capillary into the mixing chamber; and wherein each of the assay chamber and overflow chamber also comprise air displacement channels whereby air displaced by fluid movement is vented to the surface of the platform.

11. The microsystem platform of Claim 9, further comprising

j) a sacrificial valve in the third, fourth, fifth, or sixth microchannels, wherein release of the sacrificial valve permits fluid flow through the microchannel when the platform is rotated at a non-zero rotational speed.

12. The microsystem platform of Claim 11 wherein the sacrificial valve is a solid, semi-solid or viscous liquid hydrocarbon, or a plastic.

13. The microsystem platform of Claim 12 further comprising a heating element in the platform in thermal contact with the sacrificial valve, wherein heating the heating element releases the sacrificial valve.

14. The microsystem platform of Claim 9, wherein the read chamber comprises a top surface that is translucent.

15. The microsystem platform of Claim 9 wherein the fluid sample is blood.

16. A microsystem platform for separating an analyte from a fluid sample, comprising

a) a rotatable platform, comprising a substrate having a first flat, planar surface and a second flat, planar surface opposite thereto, each surface comprising a center about which the platform is rotated, wherein the first surface comprises in combination

b) an entry port comprising a depression in the first surface having a volumetric capacity of about 1 to about 150μL, that is fluidly connected by a first microchannel with

c) an assay chamber fluidly connected with the entry port, the reaction chamber further comprising

  i) a porous matrix comprising reagents for performing an analyte detection assay

wherein a fluid sample applied to the entry port is delivered to the assay chamber through the capillary microchannel by rotation of the platform, and wherein delivery of the fluid sample to the assay chamber initiates the analyte detection assay; wherein the entry port is further fluidly connected with

d) a mixing chamber positioned on the platform farther from the center of rotation than the entry port and comprising liquid reagents for preparing the fluid sample for the analyte separation assay, wherein the mixing chamber is fluidly connected by a second microchannel with

e) a secondary metering chamber comprising a first metering portion and a second overflow portion wherein the first metering portion defines a volume of the sample reagent mixture, wherein the first metering portion and the second overflow portion are separated by a septum that extends from a position in the chamber farthest from the center of rotation to a

position just short of a chamber wall closest to the center of rotation, wherein the end of the septum and the chamber wall define a fluid connection between the first metering portion and the overflow portion, and wherein the fluid connection between the first metering portion and the overflow portion is fluidly connected by a third microchannel to a read chamber positioned radially more distant from the center of rotation than the secondary metering chamber, and wherein the first metering portion of the secondary metering chamber is fluidly connected by a fourth microchannel to

f) an analyte separation assay chamber further comprising

i) an analyte binding matrix, wherein the analyte specifically binds to the matrix and is retained in the separation chamber thereby, wherein the analyte separation assay chamber is further fluidly connected by a fifth microchannel with a separation matrix buffer reservoir containing a buffer, wherein the matrix buffer reservoir is positioned closer to the center of rotation than the analyte separation assay chamber;

and wherein the analyte separation assay chamber is further fluidly connected by a sixth microchannel with

g) a read window manifold comprising a series of chambers separated by septa and arranged linearly and adjacently on the platform away from the position of the fluid connection of the manifold with the fifth microchannel;

wherein rotation of the platform motivates the fluid sample from the entry port into the mixing chamber to a sample reagent mixture, and wherein rotation of the platform motivates the sample reagent mixture from the mixing chamber into the secondary metering chamber, wherein the first metering portion is filled before the overflow portion and the read chamber is filled by fluid flow through the second microchannel before the overflow portion is filled;

and wherein rotation of the platform motivates separation matrix preparation buffer through the analyte separation assay chamber and into the read chamber manifold,

and wherein rotation of the platform motivates the volume of the sample reagent mixture from the first metering portion of the secondary metering chamber through the analyte separation assay chamber whereby analyte in the sample reagent mixture binds to the analyte binding matrix;

and wherein rotation of the platform motivates analyte separation matrix wash buffer through the analyte separation assay chamber, thereby displacing the sample reagent mixture into the read manifold.

17. The microsystem platform of Claim 16 wherein the analyte binding matrix is an inositol phosphate-derived membrane.

18 The microsystem platform of Claim 16, further comprising

h) a sacrificial valve in the fourth, fifth, sixth, or seventh microchannels, wherein release of the sacrificial valve permits fluid flow through the microchannel when the platform is rotated at a non-zero rotational speed.

19. The microsystem platform of Claim 18 wherein the sacrificial valve is a solid, semi-solid or viscous liquid hydrocarbon, or a plastic.

20. The microsystem platform of Claim 19 further comprising a heating element in the platform in thermal contact with the sacrificial valve, wherein heating the heating element releases the sacrificial valve.

21. The microsystem platform of Claim 16, wherein the read chamber comprises a top surface that is translucent.

22. The microsystem platform of Claim 16 wherein the fluid sample is blood.